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**Subject:** Annual Water and Wastewater Quality Management System Update

**Report to:** Public Works Committee

**Report date:** Tuesday, December 8, 2020

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## Recommendations

1. That Report PW 50-2020 **BE RECEIVED** for information as the Annual Water and Wastewater Quality Management System Update; and
2. That the 2020 Water QMS Internal Audit Report, 2020 Water QMS External Audit Report, and 2020 Wastewater QMS Internal Audit Report **BE RECEIVED** for information.

## Key Facts

- The purpose of this report is to provide a summary outlining the main processes and work performed internally to support the Water-Wastewater Division's Water QMS and Wastewater QMS.
- The *Drinking Water Quality Management Standard* was created under the *Safe Drinking Water Act, 2002* and requires Drinking Water System Owners to implement and maintain an accredited Water QMS. Niagara Region has maintained accreditation of its Water QMS since 2009.
- Niagara Region is not legally mandated to implement a QMS for wastewater services, however, the division has elected to do so as a due diligence measure.
- The Water QMS and the Wastewater QMS Operational Plans were previously endorsed by Council on December 12, 2019 under PW 67-2019, Annual Water-Wastewater Quality Management System Update.
- Minor administrative changes have been made to the Water QMS and Wastewater QMS Operational Plans, and these have been submitted to the Commissioner of Public Works for approval on behalf of Council as per the delegated authority granted to the Commissioner under Report PW 109-2008.

## Financial Considerations

A total of approximately \$32,500 (including non-recoverable HST) has been expended in quality management system program costs in 2020 to-date; these routine costs include annual maintenance and support fees for software used in support of the QMS, as well as consulting fees for an on-site, third-party accreditation audit of the Water

QMS. These costs were included in the 2020 approved operating budget for Water Operations. An additional estimated \$27,000 has been committed in 2020 for an upgrade to the Water-Wastewater Services Division's QMS software.

Expected expenses of \$30,000 have been included in the proposed 2021 operating budget; these expenses include consulting fees for an offsite third-party Water QMS audit and an annual QMS software maintenance and support fee.

## Analysis

This annual update summarizes the outcomes of significant quality management activities that are conducted in support of the Water QMS and Wastewater QMS, as well as internal and/or external changes that may impact either QMS.

### Water QMS

The *Safe Drinking Water Act, 2002* mandates the development, implementation, and accreditation of a drinking water quality management system as a condition of issuance of a municipal drinking water licence. Niagara Region holds five municipal drinking water licences, one for each of its drinking water systems; thus, we are legally required to maintain accreditation of our Water QMS.

### *Roles and Responsibilities – Water QMS*

Key Water QMS roles are described in Table 1.

**Table 1: Roles and Responsibilities – Water QMS**

Role	Assignment
System Owner	Niagara Region (represented by Regional Council)
Operating Authority	Niagara Region (represented by staff of the Water and Wastewater Services Division)
Top Management	Commissioner of Public Works Director, Water and Wastewater Services Division Associate Director, Water Operations & Maintenance Associate Director, Water-Wastewater Engineering Associate Director, Water-Wastewater Integrated Systems Associate Director, Water-Wastewater Asset Management

Role	Assignment
QMS Representatives	Water-Wastewater Quality Management Specialist, reporting to Associate Director, Water Operations & Maintenance ( <i>primary</i> ) Water-Wastewater Quality Management Specialist, reporting to Manager, Wastewater Quality & Compliance ( <i>backup</i> )

### *Owner Roles and Responsibilities – Water QMS*

An owner endorsement of the Water QMS Operational Plan is a requirement of our Water QMS accreditation. The Water QMS Operational Plan was last endorsed by the current term of Regional Council on December 12, 2019 under PW 67-2019, 2019 Annual Water and Wastewater QMS Update.

As Owners of Niagara Region's drinking water systems, Regional Council has specific responsibilities as defined within the *Safe Drinking Water Act, 2002*. A significant one of these is the "Standard of Care" clause (section 19 of the *Act*); the clause requires Councillors to "exercise the level of care, diligence and skill in respect of a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation" and to "act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the municipal drinking water system".

### *Internal Audits of the Water QMS*

The Water QMS is subject to annual internal audits by water and wastewater staff. All internal auditors have completed applicable training led by a qualified and competent trainer. Through the audit process, internal auditors assess conformance of the division's Water QMS with Ontario's *Drinking Water Quality Management Standard* and with divisional policies and procedures.

Three processes were selected for internal auditing in 2020:

- Competencies and training;
- Top Management communication;
- Capital project implementation and hand-off.

The division's internal audits are more rigorous and thorough than the external audit process, and the number and detail of audit findings demonstrates this. The internal audit findings include 10 non-conformances, 7 potential non-conformances/

opportunities for improvement, and 14 best practices. These findings are detailed in the Water QMS Internal Audit Report (Appendix 1 to this report).

### *External Audits of the Water QMS*

The Water QMS is also subject to external auditing by a third-party auditor as a means to achieve and maintain accreditation to the *Standard*. Accreditation of the Water QMS is a condition of the Region's Municipal Drinking Water Licences: without continued accreditation, these licences would be revoked.

A third-party auditor conducted an off-site document review in May 2020 to confirm that Water QMS documents satisfy all requirements of the Standard. No non-conformances were identified during this document review; five minor opportunities for improvement were recorded and are being addressed through updates to QMS documentation.

Following the document review, in July 2020, the third-party auditor conducted an on-site reaccreditation audit to confirm that the Water QMS adequately addresses the requirements of all 21 elements of the Standard. The Water QMS External Audit Reports (Appendix 2) provide details of the external auditor's findings. The auditor recommended that Niagara Region maintain its accreditation as a Drinking Water System Operating Authority, identifying one non-conformance and three opportunities for improvement to the QMS. The Water-Wastewater Services Division has resolved the identified non-conformance and is continuing to address the opportunities for improvement.

### *Water QMS Risk Assessment*

An internal risk assessment is required every 36 months for each of Niagara Region's water systems, with complementary risk assessment reviews to be completed at 12 and 24 months between the assessments. The last full risk assessment for the Water QMS was completed in 2018, with reviews completed in 2019 and 2020.

The following high-scoring risks were identified during the 2020 review:

- *Failure of raw water intake (Rosehill Water Treatment Plant):* This was identified as a risk due to the age of the intake pipe, which was installed in 1960. The intake shows signs of age-related failure. An environmental assessment has been initiated to replace the intake, with plans to extend it further into Lake Erie.
- *Failure of filter backwash pumps (Rosehill Water Treatment Plant):* This was a temporary risk relating to the ongoing capital upgrade at the plant. The upgrade

included replacement of both of the plant's backwash pumps, and pumping redundancy was temporarily lost in order to complete each replacement. The new pumps are now in service, and it is expected that this risk score will be significantly reduced at the next risk assessment.

- *Function of sodium bisulphite systems (Decew Falls Water Treatment Plant and Grimsby Water Treatment Plant):* This was identified as a risk due to ongoing issues with the performance of the sodium bisulphite dosing systems at the two subject treatment plants. Sodium bisulphite is used to dechlorinate process waste streams before they are discharged to the environment. There is a potential for chlorinated water to be discharged to the environment if the dosing system fails; such an event could have environmental impacts in the receiving water body and/or compliance impacts for Niagara Region. It is important to note that the sodium bisulphite systems treat waste streams only; thus, they do not impact the safety of treated drinking water. Dechlorination processes were modified in Fall 2020 to allow for sodium bisulphite dosing based on laboratory testing; the new processes were implemented in late October, with review of results planned for late November.

The Region's "critical control points", representing critical process steps, remain unchanged following the 2020 risk assessment review. They include:

- Coagulant feed;
- Filter effluent turbidity;
- Disinfectant feed;
- Primary disinfection;
- Secondary disinfection.

Risks associated with these critical control points are all low-scoring, as they are well-controlled with existing preventive measures and monitoring/response procedures.

#### *Water QMS Management Review*

Water QMS Top Management and the QMS Representative meet twice per year to complete a QMS Management Review as required by the *Standard*. At these meetings, Top Management reviews the status of the QMS and identifies corrective actions and continual improvement opportunities to enhance the QMS and associated operations.

Part 1 of the 2020 Management Review was completed on May 28, 2020; Part 2 is scheduled to be completed on December 3, 2020.

Action items identified at the Management Review meetings are summarized in Table 2.

**Table 2: Management Review Meetings and Results – Water QMS**

Review Meeting	Date	Results
Part 1 – 2019	May 31, 2019	<i>Previously reported in 2019 QMS Update to PWC</i>
Part 2 – 2019	Dec. 2, 2019	Two new action items relating to: <ul style="list-style-type: none"><li>• Infrastructure review</li><li>• Continual improvement</li></ul>
Part 1 – 2020	May 28, 2020	One new action item relating to: <ul style="list-style-type: none"><li>• Changes impacting QMS</li></ul>
Part 2 – 2019	Dec. 3, 2020	To be reported in 2021 QMS Update to PWC

*Changes Impacting the Water QMS*

No forthcoming changes have been identified that may impact the Water QMS.

Wastewater QMS

The Water-Wastewater Services Division has opted to develop and implement a Wastewater QMS as a due diligence exercise. The benefits of the Wastewater QMS are numerous and include documentation of policies and procedures, a formalized risk assessment program, incorporation of compliance requirements into standard operating procedures, and an audit program that promotes continual improvement of quality management practices.

*Roles and Responsibilities – Wastewater QMS*

Key wastewater QMS roles are described in Table 3.

**Table 3: Roles and Responsibilities – Wastewater QMS**

Role	Assignment
System Owner	Niagara Region (represented by Regional Council)
Operating Authority	Niagara Region (represented by staff of the Water and Wastewater Services Division)

Role	Assignment
Top Management	Commissioner of Public Works Director, Water and Wastewater Services Division Associate Director, Wastewater Operations & Maintenance Associate Director, Water-Wastewater Engineering Associate Director, Water-Wastewater Integrated Systems Associate Director, Water-Wastewater Asset Management
QMS Representatives	Water-Wastewater Quality Management Specialist, reporting to Manager, Wastewater Quality & Compliance ( <i>primary</i> ) Water-Wastewater Quality Management Specialist, reporting to Associate Director, Water Operations & Maintenance ( <i>backup</i> )

### *Internal Audits of the Wastewater QMS*

Like the Water QMS, annual internal audits of the Wastewater QMS are also undertaken by water and wastewater staff. All internal auditors have completed applicable training led by a qualified and competent trainer. Through the audit process, internal auditors assess conformance of the division's Water QMS with Ontario's *Drinking Water Quality Management Standard* (as modified to suit wastewater operations) and with divisional policies and procedures. As Niagara Region is not legally required to implement a Wastewater QMS, internal audits of the QMS are undertaken strictly as a best practice.

The approach to the Wastewater QMS internal audit was modified this year in response to the ongoing challenges posed by the COVID-19 pandemic. In an attempt to maintain physical distancing and limit treatment plant access to only the most essential of staff and visitors, the audit has been reduced in scope. It is being conducted as a remote desktop audit that examines a subset of the QMS elements and favours online meetings over in-person visits to treatment facilities. This approach respects the seriousness of COVID-19 while allowing the division to maintain conformance with the requirements of the Wastewater QMS.

The internal audit findings include 9 non-conformances and 9 opportunities for improvement. These findings are detailed in the Wastewater QMS Internal Audit Report (Appendix 3 to this report).

### *External Audits of the Wastewater QMS*

There is no requirement for the Wastewater QMS to be audited and accredited by an external body. Therefore, no external audits are performed.

### *Wastewater QMS Risk Assessment*

An internal risk assessment is completed every 36 months for each of Niagara Region's wastewater systems, with complementary risk assessment reviews to be completed at approximately 12 and 24 months between the assessments. The last full risk assessment for the Wastewater QMS was completed in fall 2018, with reviews initiated in November 2019 and September 2020.

91 high-risk items were identified during the 2019 review; this list was reduced to 86 high-risk items during the 2020 review. The significant number of high-scoring risks is reflective of the region's massive inventory of wastewater assets (12 treatment facilities, a bio-solids treatment facility, and 112 sewage pumping stations) and the critical need for infrastructure improvement in wastewater operations. 58 of the 86 high-scoring items from the 2020 risk assessment will be mitigated through ongoing or planned capital projects, further highlighting the need for capital improvements to wastewater system infrastructure.

### *Wastewater QMS Management Review*

Wastewater QMS Top Management and the QMS Representative meet twice per year to complete a QMS Management Review as required by the Standard. At these meetings, Top Management reviews the status of the QMS and identifies corrective actions and continual improvement opportunities to enhance the QMS and associated operations.

Part 1 of the 2020 Management Review was completed on June 22, 2020; Part 2 is scheduled to be completed on November 12, 2020.

Action items identified at the Management Review meetings are summarized in Table 4 (next page).



**Table 4: Management Review Meetings and Results – Wastewater QMS**

Review Meeting	Date	Results
Part 1 – 2019	Mar. 27, 2019	<i>Previously reported in 2019 QMS Update to PWC</i>
Part 2 – 2019	Nov. 12, 2019	Four new action items relating to: <ul style="list-style-type: none"><li>• Infrastructure review (2)</li><li>• Wastewater compliance (2)</li></ul>
Part 1 – 2020	Jun. 22, 2020	No new action items identified.
Part 2 – 2020	Nov. 12, 2020	<i>To be reported in 2020 QMS Update to PWC</i>

#### *Changes Impacting the Wastewater QMS*

The Ministry of the Environment, Conservation, and Parks (MECP) has indicated that a quality management standard will be developed for wastewater systems. Unlike the *Drinking Water Quality Management Standard*, conformance and accreditation to the Wastewater Management Standard will be voluntary. Development of the Wastewater Management Standard is industry-driven and is still in very early stages; as such, there is no forecasted date for its publication.

#### Governmental Partners

Drinking water system Operating Authority staff work closely with the MECP to ensure that comments and concerns related to current and future drafts of the Drinking Water Quality Management Standard have been considered. When changes are made to the Standard, they are incorporated into the Region's Water QMS and are also considered for incorporation into the Wastewater QMS as relevant and/or feasible.

Water and Wastewater Operating Authority staff meet quarterly with Area Municipal counterparts to share resources, experiences, and best practices pertaining to water and wastewater quality management and compliance.

#### Public and/or Service Users

The Water QMS Policy, Water QMS accreditation information, and Wastewater QMS Policy are available to the public and service users via the Niagara Region's external website.

The most current approved versions of Operational Plans are available upon request to a Water-Wastewater Quality Management Specialist ([rachel.whyte@niagararegion.ca](mailto:rachel.whyte@niagararegion.ca) or [michelle.max@niagararegion.ca](mailto:michelle.max@niagararegion.ca)).

#### Updates to the Water and Wastewater QMS Operational Plans

The Water QMS Operational Plan and Wastewater QMS Operational Plan were revised in late 2019 and were re-endorsed by Regional Council on December 12, 2019 under Report PW 67-2019, Drinking Water Compliance and Water-Wastewater Quality Management System Endorsement. Since that time, there have been administrative updates to both Operational Plans that capture minor changes to the division's organizational structure as well as recommendations for improvement received during the 2020 external accreditation audit of the Water QMS. These changes have been submitted to the Commissioner of Public Works for approval via delegated authority previously granted to the Commissioner under Report PW 109-2008.

#### **Alternatives Reviewed**

The Ministry of the Environment, Conservation, and Parks has appointed two accreditation bodies who are authorized to conduct external audits of Drinking Water Quality Management Systems under Part IV of the Safe Drinking Water Act, 2002. Niagara Region appointed QMI-SAI Global for Water QMS accreditation services in 2013. QMI-SAI continues to act as the Region's external auditor for the Water QMS.

#### **Relationship to Council Strategic Priorities**

Niagara Region's Water and Wastewater Quality Management Systems, and associated audit processes, relate directly to Council's Strategic Priority 4.1 of committing to "high quality, efficient and coordinated core services". The Water QMS and Wastewater QMS are used to drive continual improvement within the Water and Wastewater Services Division; they increase accountability by defining clear roles and responsibilities for divisional staff, and they increase data accessibility through documented standard operating procedures and associated record-keeping practices.

The Water QMS and Wastewater QMS also relate to Council's Strategic Priority 4.2 of committing to "enhanced communication". The continued accreditation of the Region's Water QMS, and the due diligence established through the Region's Wastewater QMS, provide residents with assurance that their drinking water is safe and that the associated systems are competently managed.

## Other Pertinent Reports

- PWA 109-2008, DWQMS Update (October 29, 2008).
- PW 67-2019, 2019 Annual Water and Wastewater Quality Management System Update (December 3, 2019).

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## Appendices

Appendix 1	Water QMS Internal Audit Report
Appendix 2	Water QMS External Audit Reports
Appendix 3	Wastewater QMS Internal Audit Report